

of raising all subgenera to generic rank, letting both Corbula and Aloidis go happily where they may.

The hinge of Corbula is simple indeed, with a single large tooth below the umbo in the right valve and a deep resiliary pit behind it. The left valve contains the socket into which the cardinal tooth of the right valve fits. There are no lateral teeth in either valve.

It is a delight to the beginner with hinge characters, the Steinman formula being merely LcO over Rcl.

The family Corbulidae is abundant in many fossil deposits with the result that our paleontologists have described numerous species and subgenera. There are a number of easily recognized supra-specific groups in the Recent fauna as well. A detailed discussion of these would involve one of those countless papers that should perhaps be written, but by no means ever read aloud.

The divergence of opinion regarding the higher groups to contain this family is almost as fantastic, but the nomenclature of the orders and suborders is a minor matter to most of us

and certainly no more amusing than the well known split on the name of the entire class (i.e., Lamellibranchiata - Pelecypoda - Bivalvia).

It is not that Corbula is of unusual interest or importance, but this is a typical example of seemingly countless other problems on which the authorities differ.

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A New Subspecies of *Cypraea saulae* GASKOIN, 1843

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(Plate 5)

The species Cypraea saulae Gaskoin, 1843, has been represented by three geographical races in the southwestern reaches of the Pacific Ocean: the typical species C. saulae saulae from Manila Bay, C. saulae nugata Iredale, 1935, from Lindeman Island, Queensland, and C. saulae jensostergaardi Ingram, 1939, from Koror Island in the Carolines.

From the obscurity of the Tapul Group in the Sulu Archipelago, in the early days of 1959, a new geographical race of this species appeared. While searching for other species of Cypraea, the Moro collector Gumanti-Kasula came upon two specimens of this new subspecies hidden in

coral and sponge in from two to ten feet of water. In the fourteen months that have elapsed since then, intensive search which was focused particularly upon this shell has turned up only six additional specimens.

It has been established that all of the races of Cypraea saulae are of limited and rare occurrence with only a meager representation of each race ever having been collected. Schilder (1952, p. 158) wrote: "Dautzenberg did not possess this very rare species, the three living races of which need further research for lack of material in present times; we have examined seven shells only, one shell each in the Muse-

um of Cambridge (holotype); Paris; Berlin; École des Mines (Paris); Tomlin Collection (*nugata*); Vayssière Collection (*nugata*); and in our own collection (*saulae*). Outside of Europe, there are very few shells of *saulae* and *nugata* preserved, and only one shell of *jensostergaardi* (Coll. Ingram)."

Representatives of each race differ distinctly, some differences well marked and more easily recognized than others. While the geographical barriers separating these races appear well defined, their morphological differences are less apparent, though clear and constant.

Careful comparisons were made between the various subspecies of this lesser-known Cypraeid, not only from the original descriptions and type figures, but also from a fresh, live-taken topotype of the typical species *Cypraea saulae saulae* in the author's collection (see plate 5) and from a specimen of *C. saulae jensostergaardi* in the collection of Mrs. John Q. Burch.

It is interesting to note that these rare shells

of the new subspecies share the same ecology and habitat with the other less-rare species listed here.

- Cypraea boivini* Kiener, 1843
- C. helvola helvola* Linnaeus, 1758
- C. hirundo neglecta* Sowerby, 1837
- C. ziczaz ziczaz* Linnaeus, 1758
- C. microdon microdon* Gray, 1828
- C. kieneri depriesteri* Schilder, 1933
- C. bistrinotata mediocris* Schilder and Schilder, 1937
- C. globulus globulus* Linnaeus, 1758
- C. cicercula cicercula* Linnaeus, 1758
- C. staphylaea staphylaea* Linnaeus, 1758
- C. asellus vespacea* Melvill, 1905
- C. punctata atomaria* Gmelin, 1791
- C. felina pauciguttata* Schilder, 1938
- C. nucleus nucleus* Linnaeus, 1758
- C. fimbriata marmorata* Schröter, 1804
- C. fimbriata unifasciata* Mighels, 1845
- C. teres teres* Gmelin, 1781
- C. lutea lutea* Gronow, 1781
- C. onyx onyx* Linnaeus, 1758

Table 1: Comparative Measurements of Subspecies of *Cypraea saulae*
[Measurements in millimeters]

	Length	Width	Height	Location
<i>Cypraea saulae siasiensis</i> CATE, subspec. nov.				
Holotype	25.0	13.5	10.8	B. P. Bishop Museum (No. 212719)
Paratype 1	22.5	12.8	10.0	C. N. Cate Collection
Paratype 2	27.5	14.9	12.2	C. N. Cate Collection
Paratype 3	21.8	11.6	9.7	C. N. Cate Collection
Topotype 1	26.8	14.0	11.0	Manila, Philippine Islands
Topotype 2	24.0	13.0	11.0	Manila, Philippine Islands
Hypotype [subadult]	23.4	13.8	10.0	C. N. Cate Collection
<i>Cypraea saulae saulae</i> GASKOIN, 1843				
Topotype	27.0	15.1	12.4	C. N. Cate Collection
<i>Cypraea saulae nugata</i> IREDALE, 1935				
Holotype	22.0	12.0	10.0	Australian Museum
<i>Cypraea saulae jensostergaardi</i> INGRAM, 1939				
Holotype	17.0	10.0	9.0	W. M. Ingram Collection (No. 1114)
Hypotype	19.9	10.1	9.1	Mrs. John Q. Burch Collection

The distinctly rare C. contaminata contaminata Sowerby, 1832, is also represented by four specimens found in the same area during the same fourteen-month period when the new subspecies was being taken.

Cypraea saulae siasiensis Cate, subsp. nov.
(see plate 5)

Shell light and somewhat fragile; cylindrical-ly ovate, attenuating sharply to a well produced anterior terminal collar; deeply umbilicated posteriorly, the canal curved to the left; right margin strong; lateral shelves appearing right and left at base of anterior terminal collar; posterior terminal strongly margined, reflected to the left. Aperture curved, flexuous, and narrow; teeth fine, strong, short, and numerous, not extending onto the fossula; labial teeth strong, thickened. Terminal ridge oblique; columella bulbous, curving; fossula broad and smooth, suggesting two or three faint teeth anteriorly. Dorsum light dove-gray, ornamented with a single, central, chestnut-brown blotch; faint brownish tint suffused into umbilicus; dove-gray paling perceptibly at margins and on base; teeth white, terminals and interstices deep yellow-orange, margins speckled with small chestnut spots. Very few minute pale brown flecks are scattered irregularly over the dorsum. There is no mantle line.

Key to the subspecies of Cypraea saulae

- | | |
|---------------------------------|------------------------------|
| 1. Two or more dorsal blotches | 2 |
| Not more than one dorsal blotch | <u>C. s. siasiensis</u> |
| 2. Interstices yellow or orange | 3 |
| Interstices white | <u>C. s. jensostergaardi</u> |
| 3. Columellar teeth short | <u>C. s. saulae</u> |
| Columellar teeth produced | <u>C. s. nugata</u> |

Cypraea saulae siasiensis differs from its most closely related subspecies, C. saulae nugata Iredale, in that the shell is larger; teeth are shorter and more well-defined; fossula broader, more depressed and not denticulated; interstices more fully tinted with deep orange that envelops the terminal ridge and anterior margin as well. The terminal collars are ivory to pale orange, while those of the typical species are chestnut brown.

It differs from Cypraea saulae saulae Gascoign as follows: it has a broader, smoother, less denticulate fossula; it is a smaller, narrower shell; the columellar teeth are shorter, and there are no multiple dorsal markings.

Cypraea saulae siasiensis is larger than C. saulae jensostergaardi Ingram, with shorter labial teeth; the base is beige rather than ivory; the interstices between the teeth are orange rather than white, and the general shell color is gray instead of ivory.

The holotype of Cypraea saulae siasiensis will be deposited in the Bernice P. Bishop Museum, Honolulu, Hawaii, and will bear the catalog number 212,719.



Figure 1: Map of Type Locality of Cypraea saulae siasiensis, subsp. nov.

The name siasiensis has been chosen because the type locality, Punnungan Island (approximately 5°32' N. Lat., 120°52' E. Long.) [see text fig. 1], is near Siasi, the largest of the islands in the Tapul Group and is indicated on most detailed maps. Specimens have also been collected at nearby Laminusa, another small island in the same group.

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Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6

Dorsal and Ventral Aspect

Figure 1: *Cypraea saulae saulae* GASKOIN, 1843

Figure 2: *Cypraea saulae siasiensis* subsp. nov., Holotype

Figure 3: *Cypraea saulae siasiensis* subsp. nov., Paratype No. 1

Figure 4: *Cypraea saulae siasiensis* subsp. nov., Paratype No. 2

Figure 5: *Cypraea saulae siasiensis* subsp. nov., Paratype No. 3

Figure 6: *Cypraea saulae siasiensis* subsp. nov., Hypotype

(see table 1 for actual sizes of the illustrated shells)